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of Management**

Working Paper Series

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**Working Paper n. 3/2012
April 2012**

ISSN: 2239-2734

Socially responsible mutual funds: an efficiency comparison among the European countries

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(April 2012)

Abstract. The first objective of this contribution is to evaluate the performance of SRI equity mutual funds in the main European countries with three different DEA models. Secondly, with a series of statistical tests we compare the performance of SRI and non SRI mutual funds in the various countries, to determine if SRI mutual funds have to sacrifice something in terms of financial performance. Thirdly, we compare the performance obtained by SRI mutual funds among the different European countries.

Keywords: SRI mutual funds, performance evaluation, data envelopment analysis.

JEL Classification Numbers: C65, G1, G23.

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1 Introduction

Socially responsible investment (SRI) funds have seen an increasing interest among investors.

Given the ethical considerations which drive socially responsible investments in mutual funds, investors might be willing to accept for SRI mutual funds lower financial returns. Actually, the literature on ethical investing has long investigated the issue of the eventual penalisation incurred by investments in SRI mutual funds, in search for an answer to the question whether it is possible "to do well while doing good"; see for example [8] and [9] for a brief review. The answer which comes out from many empirical investigations are somewhat surprising, since most of the results suggest that it is not necessary to sacrifice returns in order to pursue ethical objectives.

The main aims of this contribution are threefold. The first objective is to evaluate the performance of SRI equity mutual funds in the main European countries in which the socially responsible mutual funds play an important role. To this aim we apply three models designed in a DEA (data envelopment analysis) framework. DEA is an operational research technique widely used to assess the performance of a set of decision making units in many different fields, specially useful because it enables to take into account both the financial objective to get an optimal reward–to–risk result and the ethical aim (see [5] and [6]). Secondly, we compare the performance indicators for SRI and non SRI mutual funds in the various countries carrying out a series of statistical tests, with the aim of determining if the socially responsible mutual funds really entail a sacrifice in terms of financial performance. Thirdly, we compare the results obtained by SRI mutual funds in the different European countries.

The paper is organized as follows. Section 2 presents the main features of SRI mutual funds in Europe. Section 3 discusses the empirical results of the analysis carried out to evaluate the performance of SRI funds of the main European countries, while Section 4 presents the outcomes of the comparisons of the efficiency scores carried out with a series of statistical tests.

2 SRI mutual funds in Europe

On 30/06/2006, at the beginning of the triennium considered in our analysis, the number of European SRI funds was equal to 388, spread over 15 countries (Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Norway, Poland, Spain, Sweden, Switzerland, Netherlands, United Kingdom; see [11]). Three years later, on 30/06/2009, this number has increased to 683 (+76 %). In the same period the total asset under management increased from 34009 to 53276 million euros, with a growth of +57 %, showing the importance reached in Europe by the socially responsible investments.

For a more detailed presentation of the main features of socially responsible investing in Europe we refer to the Eurosif report [7] which analyses their presence in each European country. The analysis presented in this contribution considers the European socially respon-

Tabella 1: Average features of European SRI mutual funds and their non SRI counterparts by country.

	Country	No. of funds	Ethical level	% Mean return	% St. Dev.	% Excess return	% Initial charges	% Exit charges
	SRI funds							
AT	Austria	10	2.69	-9.74	22.00	-13.23	4.45	0.00
BE	Belgium	10	2.95	-8.72	21.08	-12.19	3.20	0.00
CH	Switzerland	5	2.92	-4.06	19.98	-5.86	3.40	0.01
DE	Germany	4	1.76	-7.89	18.96	-11.40	3.63	0.00
ES	Spain	2	1.15	-11.40	18.47	-14.89	0.00	3.00
FR	France	36	1.29	-6.96	20.36	-10.50	2.64	0.15
IR	Irland	3	2.06	-8.09	20.54	-11.61	2.67	0.00
IT	Italy	3	1.62	-10.68	19.05	-14.15	1.00	0.00
LU	Luxembourg	38	2.10	-6.46	20.46	-10.05	4.34	0.24
NE	The Netherlands	7	2.17	-6.33	20.09	-9.83	0.33	0.26
NO	Norway	1	3.81	-12.00	22.13	-16.60	0.20	0.30
SE	Sweden	32	1.27	-1.36	21.41	-4.77	0.31	0.36
UK	United Kingdom	39	2.26	-3.58	19.64	-8.19	4.22	0.00
	Europe	190	1.92	-5.53	20.45	-9.23	2.93	0.18
	Non SRI funds							
AT	Austria	6	0.00	-11.66	20.63	-15.16	3.33	0.00
BE	Belgium	4	0.00	-9.27	18.64	-12.72	3.25	0.00
CH	Switzerland	3	0.00	-5.60	18.11	-7.44	4.33	0.33
DE	Germany	2	0.00	-5.82	17.09	-9.29	4.00	0.00
ES	Spain	2	0.00	-13.56	18.39	-16.97	0.00	1.00
FR	France	21	0.00	-7.38	19.77	-10.88	3.05	0.05
IT	Italy	3	0.00	-8.32	18.86	-11.82	2.33	0.00
LU	Luxembourg	16	0.00	-7.13	19.43	-10.69	3.45	0.00
NE	The Netherlands	4	0.00	-4.41	18.18	-7.93	0.35	0.35
SE	Sweden	10	0.00	-1.87	21.51	-5.29	0.10	0.00
UK	United Kingdom	20	0.00	-1.48	20.36	-6.10	4.15	0.00
	Europe	91	0.00	-5.74	19.79	-9.43	2.92	0.06

sible funds which use ethical, social and/or environmental screening to select the assets in their portfolios.

In the analysis carried out we have included all the SRI European equity funds for which the data in the 'SRI Funds Service' database were available for the period 30/06/2006 to 30/06/2009. The number of SRI equity funds selected in this way is equal to 190; their distribution for the various European countries is reported in table 1, where they are grouped by country of domicile. As we can see, in the period considered the SRI funds are mainly concentrated in few countries, namely France, Luxembourg, Sweden and United Kingdom, and the analysis presented in this paper is focused on these countries.

In order to compare the performance of SRI mutual funds with that of traditional non SRI funds, we have also analysed a set of non socially responsible funds. More precisely, we have included some non SRI equity funds with features analogous to those of the European SRI funds: for each SRI fund considered, a non SRI fund with similar features and a similar investment style was selected among those offered by the same fund company, whenever one such fund was available in the Morningstar Europe database (notice that one such fund do not always exists).

Tabella 2: Frequency distribution of the ethical level e_j of SRI funds of France, Luxembourg, Sweden and UK; the last column reports the comparison with Europe.

Ethical rating class	FR	LU	SE	UK	Europe
$0 < e_j \leq 1$	18.2%	9.4%	24.5%	2.9%	21.6%
$1 < e_j \leq 2$	57.6%	20.8%	64.2%	25.0%	37.4%
$2 < e_j \leq 3$	18.2%	31.3%	11.3%	49.0%	24.7%
$3 < e_j \leq 4$	6.1%	33.3%	0.0%	23.1%	15.3%
$4 < e_j \leq 5$	0.0%	5.2%	0.0%	0.0%	1.1%

The main features of the mutual funds considered are summarised in table 1, which exhibits the average values by country; the return data taken into account are the monthly returns achieved by the mutual funds in the triennium 30/06/2006–30/06/2009 (source: Morningstar Europe). We may observe that the average values for the SRI and non SRI funds are fairly close, although the SRI funds exhibit a slightly higher mean return as well as a slightly higher standard deviation. The Welch's t test for equality of the means and the F-test for equality of the variances, however, indicate that the differences are not statistically significant, thus confirming the conclusions of most of the empirical studies (for a review of the empirical results on the comparison of the risk-return characteristics of SRI/non SRI mutual fund see e.g. [9]).

With regard to the returns obtained by the mutual funds in the period considered, they are negative for most funds, due to the financial crisis, as are the excess returns. Of course, their average value differs among the various countries; in particular, the mutual funds of Sweden and UK seem to have better faced the crisis in this slump period.

The fourth column of table 1 reports the mean ethical level of SRI mutual funds by country; the ethical level of all funds $1 \leq j \leq n$ has been computed with the ethical measure e_j proposed in [6], which takes into account both the positive and negative screening features and the eventual presence of an ethical committee and takes values in the interval $[0, 5]$. As it can be seen, the mean ethical level varies substantially among the countries, meaning that in some countries the social responsibility of SRI mutual tends to be higher than in others.

Table 2 exhibits the frequency distribution for France, Luxembourg, Sweden and UK, the four countries with the highest numbers of SRI equity funds. We may observe that the rating distributions of France and Sweden are concentrated in the lower value classes, while those of Luxembourg and UK show a somewhat more symmetric behaviour.

3 Empirical results: analysis of the performance of SRI funds of the main European countries

In this section we present the results of the empirical analysis carried out to assess the performance of SRI equity mutual funds in France, Luxembourg, Sweden and UK, i.e. the four European countries with the highest number of SRI mutual funds.

In this empirical analysis we have evaluated the performance of SRI and non SRI mutual funds by using three DEA models which can be applied even in slump periods and have been proposed in [6]; for the sake of brevity, we refer to [6] for the details of these models.

Adopting the same terminology and notation used in [6], we denote by I_{DEA-S} the efficiency score obtained with the DEA model for slump periods, *DEA-S*, by solving the relative optimisation problem; this model has non negative values of all the variables even when the mean returns are negative and does not take the ethical level into consideration. Its inputs are the initial capital invested (assumed equal to 1), the standard deviation of the returns of the mutual funds and the initial and exit charges, while the only output is the mean annual capitalization factor, i.e. 1 plus the mean return (see table 1 for the average values for each country).

Analogously, we denote by I_{DEA-SE} the efficiency score computed with the *DEA-SE* model which inserts also the ethical level among the outputs. Finally, we indicate with $I_{DEA-SEef}$ the efficiency score computed with the DEA model which assumes that the ethical level is exogenously fixed, *DEA-SEef*.

Tables 3–6 show the results of the analysis carried out on the single countries. The first columns of these tables display the features taken into account in the analysis for all mutual funds. The last columns, instead, report the main results of the performance analysis obtained with the three DEA models considered, namely the value of the performance indexes I_{DEA-S}, I_{DEA-SE} and $I_{DEA-SEef}$, as well as the ranking obtained with such models (in brackets).

It can be proved that the values of the three performance indexes computed coincide for the non SRI funds, while for the socially responsible funds we have $I_{DEA-SE} \geq I_{DEA-SEef} \geq I_{DEA-S}$. Hence, the funds which are efficient with the *DEA-S* model (that have $I_{DEA-S} = 1$) remain efficient also with the other two models. Moreover, let us observe that the fact that the two DEA models devised for socially responsible behaviour raise the value of the performance index of the SRI funds, while keeping it constant for the non SRI funds, does change the overall ranking, even for the non SRI funds.

In accordance with the fundamental idea of the DEA technique, it can be seen that a fund which excels with respect to one of the input or output variables is generally efficient: therefore it is efficient the fund with the highest mean return, the fund with the lowest standard deviation, the fund with the highest ethical level.

We may also notice that, for all the countries, the value of the I_{DEA-SE} and $I_{DEA-SEef}$ indexes and the relative ranking of the SRI funds are often very closed while they differ more notably with respect to the value of I_{DEA-S}. This seem to indicate that considering the ethical level as fixed a priori does not affect the performance results significantly, while the inclusion of the ethical level in the analysis does raise the results of the SRI funds considerably. On the other hand, when the ethical level is considered, the number of efficient funds among the SRI mutual funds roughly double. This can be seen from Tables 7, which reports some statistics on the results of the analysis carried out on the single countries, useful to compare the performance results of socially responsible and non socially responsible mutual funds computed with the three DEA models considered. From this table we may also observe that the rate of SRI funds above the median of the performance score

Tabella 3: Empirical results of the analysis of the performance of French SRI mutual funds. The last columns report the value of the performance indexes I_{DEA-S}, I_{DEA-SE} and $I_{DEA-SEef}$ and (in brackets) the relative ranking.

Fund name	Init. charge %	Exit charge %	Std. Dev. %	Mean re-turn %	Ethic. level	DEA S	DEA SE	DEA SEef
SRI funds								
AGF Euro Actions (C)	3.00	0.00	20.98	-6.48	1.57	0.959 *(23)*	0.973 *(18)*	0.973 *(18)*
AGF Valeurs Durables	3.00	0.00	20.50	-6.36	2.69	0.960 *(22)*	0.995 *(7)*	0.995 *(7)*
AXA Euro Valeurs Respons.	4.50	0.00	20.49	-4.32	1.36	0.972 *(10)*	0.992 *(8)*	0.991 *(8)*
BNP Paribas Etheis	2.00	0.00	19.04	-6.36	0.18	0.967 *(13)*	0.967 *(25)*	0.967 *(25)*
BNP Paribas Retraite Hor. P 100	2.00	0.00	18.27	-7.92	0.18	0.951 *(31)*	0.951 *(38)*	0.951 *(37)*
CAAM Actions Durables	5.00	0.00	20.47	-9.84	0.36	0.913 *(56)*	0.919 *(56)*	0.918 *(56)*
CM-CIC Valeurs Ethiques	2.00	0.00	21.13	-7.44	1.02	0.956 *(26)*	0.956 *(35)*	0.956 *(35)*
Ecureuil Bénéfices Respons.	2.00	0.00	20.85	-8.64	1.59	0.943 *(42)*	0.952 *(37)*	0.950 *(38)*
Epargne Ethique Actions	2.00	0.00	22.39	-8.40	2.51	0.946 *(38)*	0.971 *(21)*	0.970 *(22)*
Ethique et Partage - CCFD	0.00	0.00	21.94	-9.36	2.13	0.949 *(33)*	1.000 *(1)*	1.000 *(1)*
Ethis Vitalité	4.00	0.00	21.52	-6.96	1.21	0.948 *(35)*	0.962 *(30)*	0.961 *(30)*
Etoile Environnement	2.00	0.00	21.25	-8.52	0.55	0.944 *(41)*	0.944 *(44)*	0.944 *(44)*
Etoile Partenaires	2.00	0.00	20.63	-5.88	0.55	0.972 *(9)*	0.972 *(20)*	0.972 *(20)*
Euro Active Investors	5.00	0.00	22.92	-5.40	1.60	0.957 *(25)*	0.985 *(12)*	0.984 *(12)*
Euro Capital Durable I	2.00	0.00	17.63	-4.44	0.18	0.988 *(5)*	0.988 *(9)*	0.988 *(9)*
Europe Gouvernance P	3.00	0.50	19.89	-9.96	1.18	0.923 *(55)*	0.931 *(52)*	0.930 *(53)*
EuroSociétale P	3.00	0.50	22.60	-7.80	0.55	0.946 *(40)*	0.946 *(43)*	0.946 *(43)*
Federal Actions Ethiques P	3.00	0.00	24.43	-3.72	0.55	0.987 *(6)*	0.987 *(10)*	0.987 *(10)*
Génération Ethique	3.00	1.50	20.70	-8.76	1.49	0.936 *(49)*	0.949 *(39)*	0.947 *(40)*
George V Europe PEA	5.00	0.00	16.95	-6.00	1.36	0.951 *(30)*	0.976 *(16)*	0.975 *(16)*
Groupama Euro Capital Durable Retr.	5.00	0.00	17.66	-4.56	1.09	0.966 *(17)*	0.985 *(11)*	0.984 *(11)*
HSBC Actions Dével. Durable A	3.00	0.00	22.16	-8.04	0.73	0.943 *(44)*	0.943 *(46)*	0.943 *(46)*
Insertion Emplois Dynamique R	0.00	0.00	19.13	-7.08	1.18	0.975 *(7)*	0.975 *(17)*	0.975 *(17)*
LBPAM Responsable Actions Euro	2.50	0.00	20.22	-6.12	1.55	0.966 *(15)*	0.977 *(15)*	0.976 *(15)*
LCL Actions Dev Durable Euro	2.00	0.00	22.60	-7.92	1.74	0.951 *(31)*	0.962 *(32)*	0.961 *(32)*
Macif Croissance Durable & Solid.	2.00	0.00	20.98	-6.24	0.91	0.968 *(12)*	0.968 *(23)*	0.968 *(23)*
Macif Croissance Durable	4.00	0.00	20.35	-8.04	1.73	0.937 *(48)*	0.960 *(33)*	0.959 *(33)*
Macif Croissance Durable Europe	2.00	0.00	21.27	-6.36	1.73	0.967 *(13)*	0.977 *(14)*	0.977 *(14)*
MAM Actions Environnement	2.00	1.00	16,72	-9,60	0,12	0,938 *(47)*	0,938 *(49)*	0,938 *(49)*
MAM Actions Ethique	2.00	1.00	20,61	-8,40	1,08	0,946 *(38)*	0,946 *(42)*	0,946 *(42)*
MG Croissance Durable Europe	2.00	0.00	20.57	-7.80	1.73	0.952 *(29)*	0.963 *(29)*	0.961 *(31)*
Objectif Ethique Socialement Resp.	4.00	1.00	18.92	-5.28	0.55	0.965 *(19)*	0.968 *(24)*	0.968 *(24)*
Regard Actions Devel. Durable	5.00	0.00	20.18	-6.36	2.09	0.948 *(36)*	0.984 *(13)*	0.983 *(13)*
SGAM Invest Europe Dével. Durable	2.00	0.00	19.14	-7.44	3.51	0.956 *(26)*	1.000 *(1)*	1.000 *(1)*
UFG Sarasin Actions Euro Flexible I	0.00	0.00	17.95	-4.92	1.93	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
UFG Sarasin Actions Euro Mid-Cap I	0.00	0.00	20.05	-4.44	1.93	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Mean – SRI funds	2.64	0.15	20.36	-6.98	1.29	0.957 *(27)*	0.968 *(24)*	0.968 *(24)*
Non SRI funds								
AGF Eurolan	3.00	0.00	20.98	-6.96	0.00	0.954 *(28)*	0.954 *(36)*	0.954 *(36)*
AGF Actions VD	4.00	0.00	20.56	-6.00	0.00	0.958 *(24)*	0.958 *(34)*	0.958 *(34)*
AXA Valeurs Euro A Acc	4.50	0.00	21.49	-6.60	0.00	0.948 *(34)*	0.948 *(40)*	0.948 *(39)*
Parvest Europe Alpha C	5.00	0.00	20.40	-7.56	0.00	0.936 *(50)*	0.936 *(50)*	0.936 *(50)*
CAAM Actions Euro Acc	2.50	0.00	21.40	-6.12	0.00	0.966 *(15)*	0.966 *(26)*	0.966 *(26)*
CM-CIC Europe	2.00	0.00	19.48	-8.64	0.00	0.943 *(42)*	0.943 *(45)*	0.943 *(45)*
Ecureuil Actionas Européennes	2.00	0.00	21.76	-8.28	0.00	0.947 *(37)*	0.947 *(41)*	0.947 *(41)*
Ecofi Actions Rendement Euro	2.00	0.00	17.28	-10.32	0.00	0.928 *(53)*	0.928 *(54)*	0.928 *(54)*
Etoile Actions Rendement	2.00	0.00	21.34	-6.48	0.00	0.966 *(18)*	0.966 *(27)*	0.966 *(27)*
Astorg Actions Euro I	2.75	0.00	18.20	-6.36	0.00	0.962 *(21)*	0.962 *(31)*	0.962 *(29)*
Iéna Actions Européennes	3.00	0.00	20.28	-13.20	0.00	0.890 *(57)*	0.890 *(57)*	0.890 *(57)*
Orion Sicav Actions Europe	5.00	0.00	15.12	-1.20	0.00	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Groupama Euro Stock I	2.75	0.00	18.00	-6.24	0.00	0.963 *(20)*	0.963 *(28)*	0.963 *(28)*
HSBC Actions Europe Acc	5.00	0.00	21.10	-7.08	0.00	0.940 *(46)*	0.940 *(48)*	0.940 *(48)*
ABP Actions C/D	4.75	0.00	21.75	-8.16	0.00	0.931 *(52)*	0.931 *(53)*	0.931 *(52)*
LBPAM Actions Euro R	2.50	0.00	20.41	-5.76	0.00	0.970 *(11)*	0.970 *(22)*	0.970 *(21)*
LCL Actions Europe	2.00	0.00	19.62	-10.32	0.00	0.926 *(54)*	0.926 *(55)*	0.926 *(55)*
MAM Europe Rendement	2.00	1.00	15.84	-5.76	0.00	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
CNP Actions EMU LF A	0.00	0.00	19.13	-7.32	0.00	0.972 *(8)*	0.972 *(19)*	0.972 *(19)*
Regard Actions Europe	5.25	0.00	21.16	-7.92	0.00	0.932 *(51)*	0.932 *(51)*	0.932 *(51)*
SGAM Invest Europe Actions B	2.00	0.00	19.86	-8.76	0.00	0.942 *(45)*	0.942 *(47)*	0.942 *(47)*
Mean – non SRI funds	3.05	0.05	19.77	-7.38	0.00	0.951 *(32)*	0.951 *(36)*	0.951 *(36)*

Tabella 4: Empirical results of the analysis of the performance of Luxembourg SRI mutual funds. The last columns report the value of the performance indexes I_{DEA-S}, I_{DEA-SE} and $I_{DEA-SEef}$ and (in brackets) the relative ranking.

Fund name	Init. charge %	Exit charge %	Std. Dev. %	Mean re-turn %	Ethic. level	DEA S	DEA SE	DEA SEef
SRI funds								
Allianz RCM Global Sustain. A EUR	5.00	0.00	19.02	-7.68	2.63	0.920 *(31)*	0.955 *(29)*	0.953 *(29)*
Aviva Inv. Sust. Future Pan-Europ. Eq.	5.00	0.00	18.48	-5.76	3.74	0.942 *(21)*	1.000 *(1)*	1.000 *(1)*
Carnegie Worldwide Ethical 1A	0.00	0.00	17.19	-4.44	0.35	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Dexia Eqs L Sust World	3.50	0.00	18.64	-11.40	3.93	0.895 *(43)*	1.000 *(1)*	1.000 *(1)*
DWS Invest Responsibility FC	0.00	0.00	19.75	-3.12	2.66	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
DWS Invest Responsibility LC	1.50	0.00	19.83	-3.60	2.66	0.982 *(10)*	0.994 *(15)*	0.993 *(15)*
DWS Invest Responsibility NC	2.00	0.00	19.74	-4.44	2.66	0.970 *(11)*	0.986 *(16)*	0.985 *(17)*
Fortis L Equity Soc. Resp. Inv. Eur.	5.00	0.00	20.48	-10.92	0.55	0.881 *(50)*	0.881 *(52)*	0.881 *(52)*
HSBC Amanah Gl. Eq. In. Fu. Inc GBP	5.25	0.00	15.55	-1.44	0.89	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
ING (L) Invest Sust. Growth P	3.00	0.00	18.04	-8.28	3.75	0.933 *(24)*	1.000 *(1)*	1.000 *(1)*
JPM Gl. Soc. Respons. A (dist)-USD	5.00	0.00	19.45	-3.72	1.25	0.957 *(16)*	0.963 *(23)*	0.962 *(23)*
LIGA-Pax-CattolicoUnion Inc	2.50	0.00	15.97	-5.28	0.24	0.985 *(9)*	0.985 *(17)*	0.985 *(16)*
Living Planet Fund A	5.00	0.00	20.52	-6.48	4.17	0.924 *(27)*	1.000 *(1)*	1.000 *(1)*
Meridio Green Balance	5.00	0.00	22.22	-7.80	1.77	0.903 *(40)*	0.919 *(42)*	0.916 *(43)*
Oyster Respons. Develop. EUR	5.00	3.00	19.16	-12.24	2.27	0.874 *(52)*	0.902 *(47)*	0.898 *(47)*
Pictet Funds (LUX) Eur. Sust. Eq. P	5.00	1.00	19.83	-10.56	2.90	0.887 *(48)*	0.928 *(37)*	0.924 *(38)*
Pictet Funds (LUX) Eur. Sust. Eq. R	5.00	3.00	19.82	-11.40	2.90	0.879 *(51)*	0.920 *(40)*	0.915 *(44)*
Pioneer Funds-Gl. Ecology Cl. A EUR	5.00	0.00	20.66	-3.12	0.71	0.957 *(18)*	0.957 *(26)*	0.957 *(26)*
Pioneer Funds-Gl. Sust. Eq. Cl. E EUR	4.75	0.00	18.45	-9.72	2.55	0.904 *(38)*	0.937 *(35)*	0.933 *(35)*
Pioneer Funds-Gl. Sust. Eq. Cl. F EUR	0.00	0.00	18.42	-10.56	2.55	0.930 *(25)*	1.000 *(1)*	1.000 *(1)*
Postbank Dynamik-Vision Acc	3.75	0.00	22.01	-7.08	0.73	0.919 *(33)*	0.919 *(41)*	0.919 *(40)*
SAM Smart Energy Fund EUR B	5.00	0.00	35.85	9.84	1.26	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
SAM Sustainable Europe Active B	5.00	0.00	20.67	-6.72	1.26	0.921 *(30)*	0.927 *(38)*	0.925 *(37)*
SAM Sustainable Global Active B	5.00	0.00	17.23	-11.88	1.26	0.887 *(49)*	0.895 *(48)*	0.892 *(48)*
SAM Sust. Global Fund (EUR) B	5.00	0.00	17.38	-8.64	1.73	0.919 *(34)*	0.936 *(36)*	0.934 *(34)*
SAM Sustainable Water Fund EUR B	5.00	0.00	20.83	-5.28	1.26	0.935 *(23)*	0.940 *(32)*	0.939 *(31)*
Sarasin New Energy Fund EUR	5.00	0.00	29.03	-5.64	0.59	0.890 *(47)*	0.890 *(51)*	0.890 *(51)*
Sarasin OekoSar Equity-Gl. A EUR	5.00	1.00	19.86	-3.12	1.55	0.961 *(14)*	0.973 *(20)*	0.972 *(20)*
Sarasin Sust. Equity - Global	5.00	1.00	19.05	-10.32	3.02	0.894 *(44)*	0.937 *(34)*	0.933 *(36)*
SEB Ethical Europe Fund C SEK	5.00	0.00	23.75	-11.28	0.82	0.861 *(54)*	0.861 *(54)*	0.861 *(54)*
SEB ÖkoLux A	4.50	0.00	22.72	-8.16	1.90	0.900 *(41)*	0.916 *(45)*	0.913 *(45)*
Swisscanto (LU) Port.Fu. Green In. Eq.	5.00	0.00	21.06	-6.48	2.67	0.922 *(29)*	0.956 *(27)*	0.954 *(28)*
UBS (Lux) Eq. Fund-Eco Perf. (CHF) P	6.00	0.00	18.77	-7.68	3.58	0.920 *(32)*	0.976 *(19)*	0.974 *(19)*
UBS (Lux) Eq. Fund-Gl. Innov. (EUR) P	6.00	0.00	27.00	-2.64	3.70	0.928 *(26)*	1.000 *(1)*	1.000 *(1)*
UBS (Lux) Eq. Fund2 -Sust. Eur. Eq. P	6.00	0.00	19.96	-7.80	3.58	0.913 *(37)*	0.970 *(21)*	0.967 *(22)*
UBS (Lux) Islamic Fund-Gl. Eq.	6.00	0.00	15.08	-4.44	0.89	1.000 *(8)*	1.000 *(1)*	1.000 *(1)*
Öko-Aktienfonds Acc	5.00	0.00	22.79	-1.20	1.84	0.964 *(13)*	0.981 *(18)*	0.980 *(18)*
ÖkoWorld ÖkoVision Classic Acc	5.00	0.00	23.09	-7.92	3.14	0.897 *(42)*	0.944 *(31)*	0.938 *(33)*
Mean – SRI funds	4.34	0.24	20.46	-6.54	2.10	0.930 *(28)*	0.957 *(24)*	0.955 *(24)*
Non SRI funds								
Allianz RCM Global Equity AT EUR	5.00	0.00	18.47	-8.16	0.00	0.918 *(35)*	0.918 *(43)*	0.918 *(41)*
Carnegie Worldwide 1A EUR	5.00	0.00	17.21	-5.04	0.00	0.956 *(19)*	0.956 *(28)*	0.956 *(27)*
Dexia Eqs L World C	3.50	0.00	17.52	-9.24	0.00	0.923 *(28)*	0.923 *(39)*	0.923 *(39)*
DWS Invest Global Equities FC	0.00	0.00	21.24	-2.64	0.00	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
DWS Invest Global Equities LC	5.00	0.00	21.23	-3.48	0.00	0.950 *(20)*	0.950 *(30)*	0.950 *(30)*
DWS Invest Global Equities NC	3.00	0.00	21.22	-4.20	0.00	0.957 *(17)*	0.957 *(25)*	0.957 *(25)*
Fortis L Equity Europe	5.00	0.00	19.80	-10.20	0.00	0.891 *(46)*	0.891 *(50)*	0.891 *(50)*
ING (L) Invest Global Brands P	3.00	0.00	17.04	-6.24	0.00	0.959 *(15)*	0.959 *(24)*	0.959 *(24)*
JPMorgan Funds JF Gl. Eq. (USD) A	5.00	0.00	20.46	-2.04	0.00	0.968 *(12)*	0.968 *(22)*	0.968 *(21)*
UniGlobalTitans 50 net A Inc	0.00	0.00	14.62	-10.20	0.00	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Pioneer Funds-Gl. Trends E EUR ND	4.75	0.00	18.24	-8.64	0.00	0.916 *(36)*	0.916 *(44)*	0.916 *(42)*
Pioneer Funds-Gl. Trends F EUR ND	0.00	0.00	18.16	-9.84	0.00	0.939 *(22)*	0.939 *(33)*	0.939 *(32)*
Julius Baer Multipar.-Qual. Eur. Eq. B	5.00	0.00	22.91	-8.52	0.00	0.892 *(45)*	0.892 *(49)*	0.892 *(49)*
Julius Baer Multis. I-MobiFo. Sel. 90B	0.00	0.00	15.53	-7.68	0.00	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
SEB Europe 1 Fund C	5.00	0.00	24.03	-10.80	0.00	0.865 *(53)*	0.865 *(53)*	0.865 *(53)*
UBS (Lux) Eq. Fu.Euro Countr.(EUR) P	6.00	0.00	23.23	-7.08	0.00	0.904 *(39)*	0.904 *(46)*	0.904 *(46)*
Mean – non SRI funds	3.45	0.00	19.43	-7.13	0.00	0.940 *(24)*	0.940 *(31)*	0.940 *(30)*

Tabella 5: Empirical results of the analysis of the performance of Swedish SRI mutual funds. The last columns report the value of the performance indexes I_{DEA-S}, I_{DEA-SE} and $I_{DEA-SEef}$ and (in brackets) the relative ranking.

Fund name	Init. charge %	Exit charge %	Std. Dev. %	Mean re-turn %	Ethic. level	DEA S	DEA SE	DEA SEef
SRI funds								
Aktie-Ansvar Europa	0.00	0.00	20.17	-4.80	0.47	0.910 *(40)*	0.910 *(40)*	0.910 *(40)*
Aktie-Ansvar Sverige	0.00	0.00	24.20	1.44	0.47	0.961 *(19)*	0.961 *(30)*	0.961 *(30)*
Banco Etisk Global Utd	0.00	0.25	15.05	-5.40	1.82	0.982 *(7)*	0.989 *(13)*	0.989 *(13)*
Banco Etisk Sverige	0.00	0.25	26.85	0.24	1.00	0.944 *(32)*	0.951 *(34)*	0.950 *(34)*
Banco Hjälp	0.00	0.25	26.80	-0.12	1.71	0.940 *(34)*	0.974 *(22)*	0.972 *(22)*
Banco Human Pension	5.00	5.00	26.81	0.84	1.89	0.949 *(28)*	0.990 *(11)*	0.989 *(11)*
Banco Humanfonden	0.00	0.25	26.81	-0.12	1.89	0.940 *(35)*	0.981 *(16)*	0.980 *(17)*
Banco Samarit Pension	5.00	5.00	26.82	0.84	1.89	0.949 *(29)*	0.990 *(11)*	0.989 *(11)*
Banco Samaritfonden	0.00	0.25	26.79	-0.12	1.89	0.940 *(33)*	0.981 *(16)*	0.980 *(17)*
Banco Svensk Miljö	0.00	0.25	25.42	1.08	1.18	0.955 *(26)*	0.967 *(26)*	0.966 *(27)*
Danske Invest SRI Global	0.00	0.00	14.98	-4.68	1.94	0.991 *(5)*	1.000 *(1)*	1.000 *(1)*
Danske Invest SRI Sverige (index)	0.00	0.00	25.42	1.68	1.94	0.960 *(20)*	1.000 *(1)*	1.000 *(1)*
Eldsjäl Biståndsfond	0.00	0.00	21.12	0.48	1.47	0.958 *(23)*	0.981 *(18)*	0.980 *(16)*
Eldsjäl Gåvofond	0.00	0.00	24.04	2.88	1.47	0.975 *(10)*	0.995 *(9)*	0.995 *(9)*
Eldsjäl Sverigefond	0.00	0.00	23.50	2.28	1.47	0.970 *(12)*	0.991 *(10)*	0.991 *(10)*
Folksams Idrottsfond	0.00	0.00	19.19	-0.96	1.24	0.955 *(25)*	0.968 *(24)*	0.967 *(25)*
KPA Etisk Aktiefond	0.00	0.00	18.99	-0.48	2.30	0.963 *(17)*	1.000 *(1)*	1.000 *(1)*
SEB Cancerfonden	0.00	0.00	20.60	-8.40	0.47	0.874 *(42)*	0.874 *(42)*	0.874 *(42)*
SEB Etisk Globalfond	0.00	0.00	16.59	-8.76	0.94	0.921 *(39)*	0.922 *(39)*	0.922 *(39)*
SEB Stiftelsefond Sverige	0.00	0.00	29.54	6.84	0.82	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
SEB Stiftelsefond Utland	0.00	0.00	16.76	-8.40	0.82	0.922 *(38)*	0.922 *(38)*	0.922 *(38)*
SEB Östersjöfond/WWF Utd	0.00	0.00	22.27	1.32	0.59	0.964 *(16)*	0.964 *(28)*	0.964 *(28)*
Skandia Idéer För Livet	0.00	0.00	24.07	2.52	0.47	0.971 *(11)*	0.971 *(23)*	0.971 *(23)*
SPP Aktieindexfond Gl. Sust.	0.00	0.00	15.82	-4.08	2.32	0.982 *(8)*	1.000 *(1)*	1.000 *(1)*
Swedbank Robur Ethica Gl. MEGA	0.00	0.00	14.82	-4.20	1.59	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Swedbank Robur Ethica Miljö Sv. Utd	0.00	0.00	25.86	2.16	1.18	0.964 *(15)*	0.976 *(20)*	0.975 *(20)*
Swedbank Robur Ethica Sv. Gl.	0.00	0.00	19.61	-0.96	1.71	0.949 *(30)*	0.978 *(19)*	0.977 *(19)*
Swedbank Robur Talent. Aktief. MEGA	0.00	0.00	20.02	0.24	1.71	0.958 *(22)*	0.988 *(14)*	0.987 *(14)*
Öhman Etisk Index Europa	0.00	0.00	16.40	-5.16	0.47	0.961 *(18)*	0.961 *(29)*	0.961 *(29)*
Öhman Etisk Index Japan	0.00	0.00	15.38	-9.24	0.47	0.936 *(37)*	0.937 *(37)*	0.937 *(37)*
Öhman Etisk Index Pacific	0.00	0.00	19.70	4.56	0.59	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Öhman Etisk Index USA	0.00	0.00	14.61	-7.08	0.59	0.984 *(6)*	0.984 *(15)*	0.984 *(15)*
Mean – SRI funds	0.31	0.36	21.41	-1.36	1.27	0.957 *(21)*	0.972 *(18)*	0.972 *(19)*
Non SRI funds								
Banco Sverige	1.00	0.00	26.54	0.24	0.00	0.944 *(31)*	0.944 *(35)*	0.944 *(35)*
Danske Invest Sverige	0.00	0.00	28.02	3.84	0.00	0.975 *(9)*	0.975 *(21)*	0.975 *(21)*
SEB Europafond	0.00	0.00	20.68	-7.44	0.00	0.883 *(41)*	0.883 *(41)*	0.883 *(41)*
SEB Globalfond	0.00	0.00	15.21	-6.48	0.00	0.968 *(13)*	0.968 *(25)*	0.968 *(24)*
SEB Sverigef. Smabolag Chance/Risk	0.00	0.00	26.49	-0.24	0.00	0.940 *(36)*	0.940 *(36)*	0.940 *(36)*
SEB Globalfond-Lux ack	0.00	0.00	15.46	-7.20	0.00	0.956 *(24)*	0.956 *(32)*	0.956 *(32)*
SEB Nordenfond	0.00	0.00	22.73	0.48	0.00	0.955 *(27)*	0.955 *(33)*	0.955 *(33)*
Swedbank Robur Globalfond MEGA	0.00	0.00	15.02	-3.72	0.00	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Swedbank Robur SverigefondUtd	0.00	0.00	25.87	2.52	0.00	0.967 *(14)*	0.967 *(27)*	0.967 *(26)*
Swedbank Robur IP Aktiefond	0.00	0.00	19.08	-0.72	0.00	0.960 *(21)*	0.960 *(31)*	0.960 *(31)*
Mean – non SRI funds	0.10	0.00	21.51	-1.87	0.00	0.955 *(22)*	0.955 *(28)*	0.955 *(28)*

Tabella 6: Empirical results of the analysis of the performance of UK SRI mutual funds. The last columns report the value of the performance indexes I_{DEA-S}, I_{DEA-SE} and $I_{DEA-SEef}$ and (in brackets) the relative ranking.

Fund name	Init. charge %	Exit charge %	Std. Dev. %	Mean re-turn %	Ethic. level	DEA S	DEA SE	DEA SEef
SRI funds								
Aberdeen Ethical World A	4.25	0.00	21.02	2.16	1.72	0.878 *(25)*	0.886 *(34)*	0.884 *(34)*
Aberdeen Fellowship R	4.25	0.00	18.16	-3.48	2.54	0.873 *(27)*	0.950 *(19)*	0.941 *(19)*
Aberdeen Multi-Manager Ethical	4.00	0.00	17.26	-0.60	1.56	0.936 *(10)*	0.968 *(16)*	0.965 *(15)*
AEGON Ethical Equity A	5.50	0.00	18.08	-1.92	2.76	0.886 *(21)*	0.971 *(14)*	0.965 *(14)*
Aviva Inv. Sust. Future Eur. Growth SC1	4.00	0.00	19.57	2.52	2.89	0.890 *(19)*	0.953 *(18)*	0.944 *(17)*
Aviva Inv. Sustainable Future Gl. Growth	4.00	0.00	18.81	-0.84	2.89	0.883 *(24)*	0.962 *(17)*	0.955 *(16)*
Aviva Investors UK Ethical SCA	5.00	0.00	19.32	-4.44	2.89	0.835 *(45)*	0.901 *(29)*	0.885 *(32)*
Aviva Investors UK Growth SC1	0.00	0.00	18.61	-3.48	2.89	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
AXA Ethical Distribution I	0.00	0.00	20.80	-9.36	1.53	0.887 *(20)*	0.909 *(27)*	0.906 *(25)*
AXA Ethical Distribution R	5.00	0.00	20.81	-9.84	1.53	0.775 *(55)*	0.783 *(57)*	0.780 *(57)*
AXA Framlington Health	5.50	0.00	15.85	2.04	0.59	0.984 *(9)*	1.000 *(1)*	1.000 *(1)*
CIS Sustainable Leaders Trust Inc	5.00	0.00	18.77	-0.96	2.78	0.878 *(26)*	0.946 *(22)*	0.938 *(21)*
CIS UK FTSE4Good Tracker Tr	0.00	0.00	18.36	-5.40	1.56	0.993 *(7)*	0.993 *(10)*	0.993 *(10)*
Ecclesiastical Amity UK A Inc	5.00	0.00	18.77	-4.92	2.96	0.843 *(39)*	0.922 *(24)*	0.910 *(24)*
F&C Stewardship Growth 1	5.00	0.00	19.50	-8.04	2.89	0.799 *(51)*	0.867 *(39)*	0.845 *(45)*
F&C Stewardship Income 1	5.00	0.00	17.82	-7.20	2.89	0.845 *(38)*	0.949 *(20)*	0.938 *(22)*
F&C Stewardship International 1	5.00	0.00	18.44	0.24	2.89	0.897 *(14)*	0.977 *(13)*	0.973 *(13)*
Family Charities Ethical Trust	7.00	0.00	21.72	-7.56	1.18	0.795 *(53)*	0.799 *(56)*	0.798 *(54)*
First State As Pac Sustainability A	4.00	0.00	19.64	15.48	1.91	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Halifax Ethical C Inc	0.00	0.00	19.61	1.32	0.66	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Henderson Global Care Growth	4.50	0.00	19.62	3.00	3.91	0.892 *(17)*	1.000 *(1)*	1.000 *(1)*
Henderson Global Care UK Income A	4.50	0.00	21.73	-7.08	3.79	0.799 *(52)*	0.970 *(15)*	0.896 *(27)*
Henderson Industries of the Future A	5.00	0.00	19.22	3.24	3.61	0.904 *(13)*	1.000 *(1)*	1.000 *(1)*
Insight Investment Evergreen A	4.00	0.00	20.45	-0.24	2.53	0.858 *(32)*	0.912 *(26)*	0.898 *(26)*
Jupiter Ecology	5.00	0.00	19.88	2.40	3.61	0.884 *(23)*	0.981 *(12)*	0.976 *(12)*
Jupiter Environmental Income	5.25	0.00	19.82	-5.16	3.26	0.820 *(46)*	0.904 *(28)*	0.886 *(31)*
Legal & General Ethical Trust (R)	0.00	0.00	21.80	-6.00	1.53	0.914 *(12)*	0.942 *(23)*	0.939 *(20)*
Marlborough Ethical A	5.25	0.00	20.28	-6.36	1.38	0.805 *(50)*	0.810 *(52)*	0.809 *(51)*
Old Mutual Ethical A	4.00	0.00	20.73	-10.20	2.80	0.772 *(58)*	0.849 *(46)*	0.822 *(50)*
Prudential Ethical Trust A	4.75	0.00	21.81	-9.96	1.29	0.774 *(56)*	0.779 *(58)*	0.778 *(58)*
RBS FTSE 4Good Tracker	5.00	0.00	19.10	-3.36	0.35	0.849 *(37)*	0.849 *(45)*	0.849 *(44)*
Real Life A	4.00	0.00	16.54	-7.32	1.59	0.896 *(15)*	0.948 *(21)*	0.943 *(18)*
Scottish Widows Environ. Investor A	7.00	0.00	19.99	-10.32	2.12	0.774 *(57)*	0.808 *(54)*	0.786 *(56)*
Scottish Widows Ethical A	7.00	0.00	19.82	-9.60	2.24	0.781 *(54)*	0.819 *(51)*	0.797 *(55)*
Skandia IM Ethical	5.00	0.00	19.47	-3.24	1.53	0.842 *(40)*	0.842 *(47)*	0.842 *(46)*
Sovereign Ethical	3.00	0.00	21.65	-14.16	1.19	0.758 *(59)*	0.764 *(59)*	0.761 *(59)*
Standard Life UK Ethical R	4.00	0.00	22.32	-5.88	3.01	0.809 *(47)*	0.894 *(31)*	0.873 *(35)*
SWIP Global SRI E	5.00	0.00	19.16	-4.44	2.41	0.838 *(43)*	0.884 *(36)*	0.870 *(38)*
SWIP Pan-European SRI Equity E	5.00	0.00	21.50	-0.60	2.41	0.855 *(35)*	0.898 *(30)*	0.885 *(33)*
Mean – SRI funds	4.22	0.00	19.64	-3.58	2.26	0.864 *(32)*	0.913 *(27)*	0.903 *(28)*
Non SRI funds								
Aberdeen World Equity A	4.25	0.00	19.64	3.00	0.00	0.892 *(18)*	0.892 *(33)*	0.892 *(29)*
Aberdeen Alpha Growth R	4.25	0.00	17.98	-4.32	0.00	0.871 *(29)*	0.871 *(38)*	0.871 *(37)*
Aviva Investors European Equity SC1	0.00	0.00	23.55	4.08	0.00	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Aviva Investors World Leaders SC1	5.25	0.00	18.48	-3.24	0.00	0.865 *(30)*	0.865 *(40)*	0.865 *(39)*
Aviva Investors UK Focus SC1	5.00	0.00	22.59	-2.28	0.00	0.840 *(41)*	0.840 *(48)*	0.840 *(47)*
F&C Global Growth 1	5.00	0.00	19.50	-1.68	0.00	0.855 *(34)*	0.855 *(43)*	0.855 *(42)*
F&C UK Opportunities 1	5.00	0.00	21.82	-6.24	0.00	0.806 *(49)*	0.806 *(55)*	0.806 *(53)*
F&C UK Opportunities 2	1.00	0.00	21.83	-5.64	0.00	0.886 *(22)*	0.886 *(35)*	0.886 *(30)*
First State Asia Pacific A	4.00	0.00	20.31	16.32	0.00	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Henderson UK Equity A	5.00	0.00	18.48	-6.48	0.00	0.836 *(44)*	0.836 *(50)*	0.836 *(49)*
Legal & General Equity Trust (R)	5.00	0.00	18.72	-4.20	0.00	0.851 *(36)*	0.851 *(44)*	0.851 *(43)*
MFN Bowland	7.00	0.00	23.23	-6.00	0.00	0.808 *(48)*	0.808 *(53)*	0.808 *(52)*
Old Mutual Equity Income	4.00	0.00	18.10	-4.56	0.00	0.872 *(28)*	0.872 *(37)*	0.872 *(36)*
Prudential Equity Income Trust A	4.75	0.00	18.06	-4.80	0.00	0.861 *(31)*	0.861 *(41)*	0.861 *(40)*
RBS FTSE 100 Tracker	0.00	0.00	18.89	-3.72	0.00	0.984 *(8)*	0.984 *(11)*	0.984 *(11)*
Scottish Widows UK Eq Income A	7.00	0.00	17.84	-7.68	0.00	0.840 *(42)*	0.840 *(49)*	0.840 *(48)*
Skandia Newton Managed Fund	5.00	0.00	15.15	1.56	0.00	1.000 *(1)*	1.000 *(1)*	1.000 *(1)*
Standard Life UK Eq Unconstrained	4.00	0.00	31.57	6.96	0.00	0.920 *(11)*	0.920 *(25)*	0.920 *(23)*
SWIP MM International Equity P Inc	3.75	0.00	19.08	0.48	0.00	0.894 *(16)*	0.894 *(32)*	0.894 *(28)*
SWIP Pan-European Equity E	3.75	0.00	22.31	-1.20	0.00	0.855 *(33)*	0.855 *(42)*	0.855 *(41)*
Mean – non SRI funds	4.15	0.00	20.36	-1.48	0.00	0.887 *(26)*	0.887 *(34)*	0.887 *(33)*

Tabella 7: Summary statistics of the empirical results of the analysis of the performance on the single countries (France, Luxembourg, Sweden and UK) considered; the results are compared for the three DEA model applied.

	FR	LU	SE	UK
DEA-S				
Percentage of efficient funds	7.0%	13.0%	9.5%	10.2%
Percentage of SRI efficient funds	5.6%	10.5%	9.4%	7.7%
Percentage of non SRI efficient funds	9.5%	18.8%	10.0%	15.0%
Average performance	0.955	0.933	0.957	0.872
Average performance of SRI funds	0.957	0.930	0.957	0.864
Average performance of non SRI funds	0.951	0.940	0.955	0.887
Median of the performance score	0.952	0.923	0.959	0.865
Percentage of SRI funds above the median	52.8%	47.4%	50.0%	48.7%
Percentage of non SRI funds above the median	47.6%	56.3%	50.0%	55.0%
DEA-SE				
Percentage of efficient funds	10.5%	25.9%	19.0%	15.3%
Percentage of SRI efficient funds	11.1%	28.9%	21.9%	15.4%
Percentage of non SRI efficient funds	9.5%	18.8%	10.0%	15.0%
Average performance	0.962	0.952	0.968	0.904
Average performance of SRI funds	0.968	0.957	0.972	0.913
Average performance of non SRI funds	0.951	0.940	0.955	0.887
Median of the performance score	0.963	0.956	0.975	0.898
Percentage of SRI funds above the median	61.1%	55.3%	59.4%	64.1%
Percentage of non SRI funds above the median	33.3%	37.5%	20.0%	25.0%
DEA-SEef				
Percentage of efficient funds	10.5%	25.9%	19.0%	15.3%
Percentage of SRI efficient funds	11.1%	28.9%	21.9%	15.4%
Percentage of non SRI efficient funds	9.5%	18.8%	10.0%	15.0%
Average performance	0.962	0.951	0.968	0.898
Average performance of SRI funds	0.968	0.955	0.972	0.903
Average performance of non SRI funds	0.951	0.940	0.955	0.887
Median of the performance score	0.962	0.955	0.974	0.886
Percentage of SRI funds above the median	58.3%	52.6%	59.4%	56.4%
Percentage of non SRI funds above the median	38.1%	43.8%	20.0%	40.0%

of a country increases markedly for the two DEA models which takes the ethical level into consideration.

As for the differences among the various countries, we may observe that the SRI mutual funds on average exhibit a slightly better performance than the non SRI funds in France and Sweden, even considering the results of I_{DEA-S} which do not take the ethical level into account, while the opposite occurs in Luxembourg and UK. It remains to be seen if these differences are statistically significant, and this issue will be considered in next section. On the other hand, the results obtained using I_{DEA-SE} and $I_{DEA-SEef}$, which explicitly consider the socially responsible behaviour, considerably improve the performance of SRI funds for all the countries. In next section we will also test whether the results among the different countries are statistically significant.

4 Empirical results: efficiency comparisons

As we have outlined in the introduction, the literature is not in complete accord on the connection between social responsibility and the financial performance of SRI mutual funds (for a discussion on this issue see for example [8] and [9]). It is therefore interesting to see which indications come out from the results of our analysis concerning the European funds in the period 30/06/2006–30/06/2009.

We have seen in the previous section that the average value and the variance of the mean returns of SRI mutual funds do not differ statistically different from those of non SRI funds. Now let us compare the performance results of SRI and non SRI mutual funds and test wether their differences are statistically significant. To this aim we apply some statistical tests specially designed for the DEA performance scores.

Indeed, an advantage of the DEA methodology is that it gives the possibility to test the (eventual) presence of differences in the performance score between two groups of decision making units. The statistical tests proposed in the literature to verify the presence of these differences come from two different approaches which date back to Banker [1] and Simar and Wilson [10], respectively, and are based on different hypothesis on the underlying data-generating process. There is discussion on which approach is to be preferred, and we can find empirical applications of both; in this paper we apply several tests reported in [3], which are based on different assumptions on the distribution of the "true" inefficiency measure.

More precisely, we have computed the three tests which assume that the deviations of the actual output from the production frontier arise only from a stochastic inefficiency term (see [3], par. 11.2.2) and [2]:

A1. a test based on the assumption that the logarithm of the true inefficiency is exponentially distributed; in this case, under the null hypothesis H_0 the test statistics is distributed as an F distribution;

A2. a test based on the assumption that under the null hypothesis the logarithm of the true inefficiency is distributed as half-normal; under H_0 the test statistics is again distributed as an F distribution;

A3. a test with no assumptions on the distribution of the true inefficiency: the Kolmogorov-Smirnov's test statistics for the equality of the distributions of the logarithm of the true inefficiency between the two groups.

In addition, we have computed also five tests suitable when the data generating process involves both an inefficiency term and a noise term independent of the inefficiency (see [3], par. 11.4.1):

B1. a test based on the statistical significance of the slope parameter of a regression of the DEA inefficiency scores on a dummy variable;

B2. a test designed to evaluate the null hypothesis that there is no difference in the mean inefficiency between the two groups;

B3. a test designed to evaluate the equality of the median of the inefficiencies between the two groups;

B4. the Mann-Whitney test to compare the DEA efficiency scores of the two groups;

B5. a Kolmogorov-Smirnov's test to compare the distributions of the DEA inefficiencies between the two groups.

For each country (France, Luxembourg, Sweden, UK) we have computed these 8 tests to compare the DEA performance of the SRI and non SRI mutual funds. As for the DEA model used in these comparisons, we were specially interested in testing the differences for the *DEA-S* model that does not give any reward to the SRI funds. In agreement with most of the empirical results reported in the literature, with a 0.05 significance level all the tests carried out lead to accept the null hypothesis of no differences.

We have also replicated the tests with the *DEA-SE* model, and we expected results more favourable to the SRI funds. This actually happens, but only in some cases the tests indicate that the alternative hypothesis H_1 of different distributions for the DEA efficiencies can be accepted: for France, Sweden and UK, in particular with the two Kolmogorov-Smirnov's tests (A3 and B5) which seem to reject the null hypothesis more frequently.

Moreover, we have carried out a second series of tests with the aim to compare the DEA efficiency of the SRI mutual funds across the countries. In order to do so, we have computed the DEA efficiency scores for all the European funds considered all together and then we have tested the differences between pairs of countries; the tests have been carried out both with the *DEA-S* model that considers only the financial inputs and outputs and the *DEA-SE* model that takes into account also the ethical level.

The main results are summarized in table 8, which shows which hypothesis, H_0 or H_1, is accepted using a 0.05 significance level; the p-values of the test are also reported. This table reports the results obtained with the the two Kolmogorov-Smirnov's tests (A3 and B5); the other tests, with the exception of the test B1 based on a regression, which never leads to reject the null hypothesis, generally give similar results, with few exceptions. Let us observe that using the *DEA-S* model the tests suggest that the differences in the performance scores are statistically significant for all the comparisons. On the other hand, if we take the ethical

Tabella 8: Hypothesis accepted with the Kolmogorov-Smirnov tests B5 carried out to compare the DEA efficiency score of the mutual funds across the countries (significance level 0.05); the p-value of the tests are also reported.

	FR-LU	FR-SE	FR-UK	LU-SE	LU-UK	SE-UK
DEA-S						
SRI mutual funds	H_1	H_1	H_1	H_1	H_1	H_1
p-value	0.024	0.000	0.017	0.000	0.025	0.000
All mutual funds	H_0	H_1	H_1	H_1	H_1	H_1
p-value	0.071	0.000	0.000	0.000	0.003	0.000
DEA-SE						
SRI mutual funds	H_0	H_1	H_1	H_1	H_0	H_1
p-value	0.098	0.000	0.001	0.000	0.096	0.000
All mutual funds	H_1	H_1	H_1	H_1	H_0	H_1
p-value	0.047	0.000	0.000	0.000	0.106	0.000

Tabella 9: Winners of the pairwise comparisons of the DEA efficiency scores carried out with the Kolmogorov-Smirnov test B5. Country 1 $\succ$ country 2 means that the winner (with the highest values of the scores) is country 1, while country 1 $\prec$ country 2 denotes the pairs in which the winner is country 2 (significance level 0.05); the p-value of the tests are also reported.

	FR-LU	FR-SE	FR-UK	LU-SE	LU-UK	SE-UK
DEA-S						
SRI mutual funds	$FR \succ LU$	$FR \prec SE$	$FR \prec UK$	$LU \prec SE$	$LU \prec UK$	$SE \succ UK$
p-value	0.012	0	0.008	0	0.013	0
All mutual funds		$FR \prec SE$	$FR \prec UK$	$LU \prec SE$	$LU \prec UK$	$SE \succ UK$
p-value		0	0.001	0	0.002	0
DEA-SE						
SRI mutual funds		$FR \prec SE$	$FR \prec UK$	$LU \prec SE$		$SE \succ UK$
p-value		0	0	0		0
All mutual funds	$FR \prec LU$	$FR \prec SE$	$FR \prec UK$	$LU \prec SE$		$SE \succ UK$
p-value	0.023	0	0	0		0

level into consideration, using the *DEA-SE* model, in two cases (for the pairs FR-LU and LU-UK) the differences in the DEA scores are no longer statistically significant.

We have also tested if the differences remains valid also for the non SRI funds, by comparing all the funds (both SRI and non SRI ones) of the two countries considered; from table 8 we may see that the hypothesis that is accepted changes only for the comparison between France and Luxembourg.

Table 9 shows the winner of each pairwise comparison, when the differences in the performance scores are statistically significant. We denote by country 1 $\succ$ country 2 the pairs in which the "winner" (with the highest values of the performance scores) is country 1, and by country 1 $\prec$ country 2 the pairs in which the winner is country 2. We may observe that the "winner" among all the countries considered is undoubtedly Sweden, while the "looser" (the country with the lowest values of the efficiency score) is Luxembourg if the scores are computed with the *DEA-S* model and it is France if they are computed with the *DEA-SE* model. On the other hand, this can be explained by remembering that the ethical level of Luxembourgian SRI funds is on average higher than that of French funds.

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